KEITHLEY

# Model 175 Addendum

## INTRODUCTION

The following information is supplied as a supplement to this manual in order to provide the user with the latest improvements and corrections in the shortest possible time. It is recommended that this information be incorporated into the manual immediately.

## CALIBRATION

The Model 175 Multimeter has been improved to make calibration of the instrument more convenient for the user. Later versions of the Model 175 (with Revision B or C software) can now be calibrated without having to open up the unit.

To determine what level software your instrument has, hold in the dB button and turn on the Model 175. First, all LCD digits and annunciators turn on, then the software revision level will be displayed (for example, A1). The instrument will then run a display test and go into troubleshooting diagnostics. Cycle power to return unit to normal operation.

### Revision A Software

If you have Revision A level software in your Model 175, then there is an internal calibration jumper that enables permanent storage of calibration constants. In this case, follow the exact calibration procedure as it currently appears in the Model 175 Instruction Manual in paragraph 5.7 for front panel calibration and paragraph 5.8 for calibration over the IEEE-488 bus.

KEITHLEY

ADDENDUM
175-901-02C
12/84

# Instruction Manual Addendum
# Model 175 Autoranging Multimeter

## INTRODUCTION

The following information is supplied as a supplement to this manual in order to provide the user with the lastest improvements and corrections in the shortest possible time. It is recommended that this information be incorporated into the manual immediately.

Instruments with B.1 or newer software no longer use an internal calibration jumper to enable NVRAM storage of calibration constants. This eliminates the need to remove the top cover to calibrate the instrument if frequency compensation has been verified. Make the following changes to the Model 175 Instruction Manual to reflect this design improvement:

1. Delete paragraph 5.7.2 Calibration Jumper, on page 5-7 and replace with the following:

### 5.7.2 Calibration Storage Enable

The Model 175 must be in the calibration storage enable mode in order to realize storage of the calibration constants into NVRAM. If the instrument is not placed in this mode, subsequent calibration will be lost when the instrument is turned off. Perform the following steps to place the Model 175 in the calibration storage enable mode:

A. If the Model 175 is presently on, turn it off using the ON/OFF power switch.
B. While holding in the STO/CLR button, turn the instrument on using the ON/OFF power switch.
C. When the message "CAL" is displayed, release the STO/CLR button. The instrument will return to the normal display mode and the storing of calibration constants is now enabled.

2. Delete paragraph 5.7.8 Calibration Storage and Figure 5-2, on page 5-9; replace with the following:

### 5.7.8 Calibration Storage

To store the calibration constants and exit the calibration mode, simultaneously press the REL and dB buttons until the message "Stor" is displayed. If instead the message "out" is displayed, then calibration storage was not enabled as explained in paragraph 5.7.2 and the calibration constants will only be valid until the Model 175 is turned off.

3. Add the following program statement to the calibration program on page 5-10.

| PROGRAM | COMMENTS |
|---|---|
| `15 OUTPUT 724;"V0.1X"` | `ENSURES THAT THE 175 IS PROPERLY IN THE CALIBRATION MODE.` |

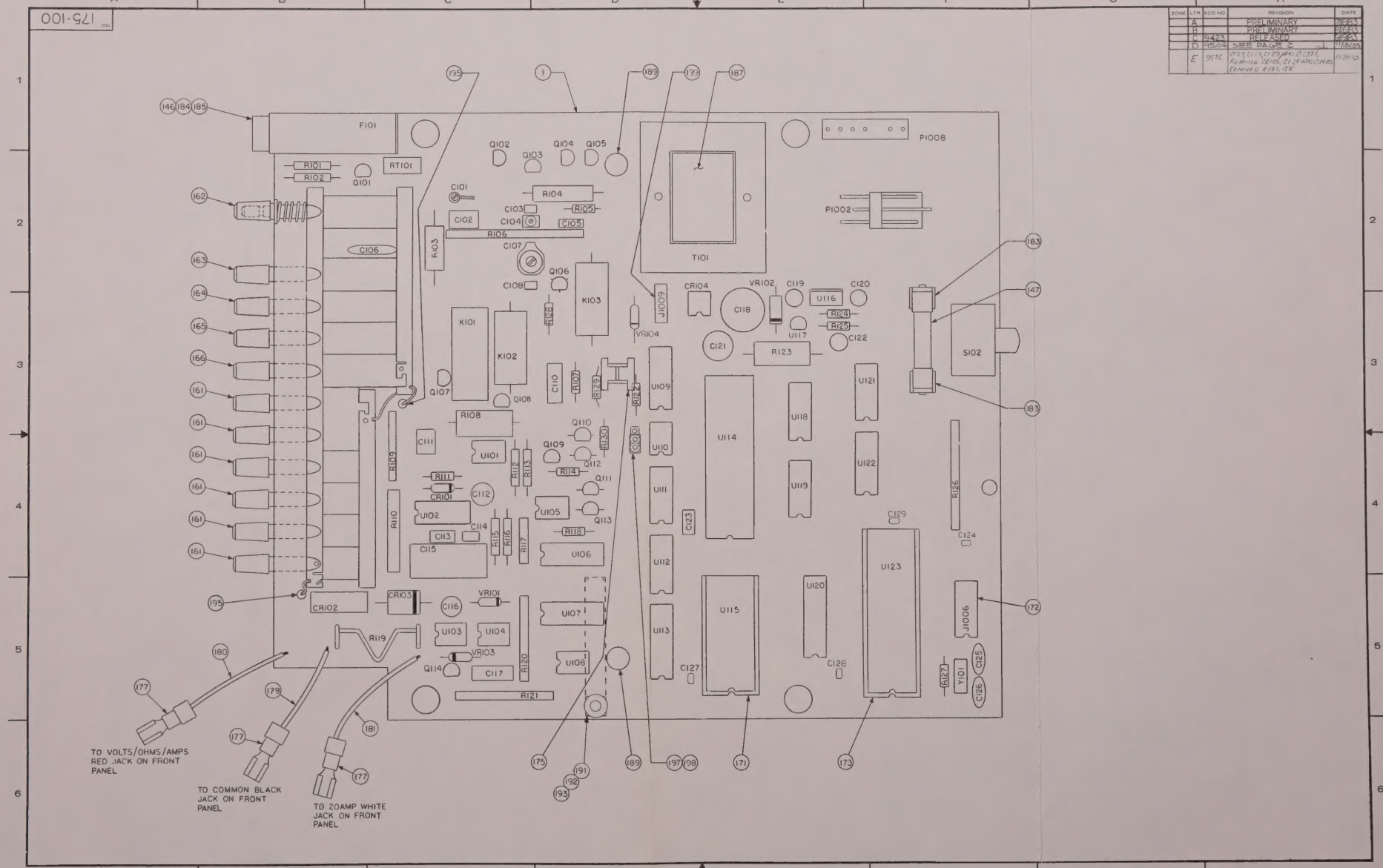


**Figure 6-5. Mother Board, Component Location Drawing, Dwg. No. 175-100 (Page 1 of 2)**

175-100 ON

| ZONE | LTR | ECO NO. | REVISION | DATE |
|---|---|---|---|---|
| | A | | PRELIMINARY | 7/6/83 |
| | B | | PRELIMINARY | 8/8/83 |
| | C | 9423 | RELEASED | 9/9/83 |
| | D | 9504 | ADDED ITEMS 38-39 C-237-1103 C123-C129 ITEM 54 WAS R-76-200K ADD NO ITEMS WAS 49 R-76-200K DIST PADS ADDED ITEM 57-58 BALANCE ITEM 43 WAS 75 OHM ITEM 113 WAS EC 9502 ITEM 122 WAS LSI-52 ADDED WIRE TO ITEM 197 ADDED ITEMS 198-199 CHANGE 21 TO 22 | 11/18/83 |
| | E | 9516 | DOT, CR2, CR3, CR4, W1, E2, J1, REMOVED JMP 7, C124 W1 (24 PL) REMOVED C131, 132 | 12/27/83 |

| ITEM | PART NO. | SCHEM. DESIG. | ZONE |
|---|---|---|---|
| 1 | 175-101 | STAKING | D1 |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | C-184 | C101 | C2 |
| 6 | C-349-6.2p | C102 | C2 |
| 7 | C-348-18p | C103 | C2 |
| 8 | C-346 | C104 | C2 |
| 9 | C-347-8200p | C105 | D2 |
| 10 | C-316-.02 | C106 | C2 |
| 11 | C-345 | C107 | D2 |
| 12 | C-348-710p | C108 | D2 |
| 13 | | | |
| 14 | C-306-.01 | C110 | D3 |
| 15 | C-350-1 | C111 | C3 |
| 16 | C-321-15 | C112 | C4 |
| 17 | C-237-1 | C113 | C4 |
| 18 | C-237-.1 | C114 | C4 |
| 19 | C-294-2 | C115 | C4 |
| 20 | C-314-10 | C116 | C5 |
| 21 | C-306-.01 | C117 | C5 |
| 22 | C-314-1500 | C118 | E2 |
| 23 | C-314-4.7 | C119 | E2 |
| 24 | " | C120 | E2 |
| 25 | C-314-250 | C121 | E3 |
| 26 | C-314-4.7 | C122 | E3 |
| 27 | C-237-1 | C123 | D4 |
| 28 | C-237-1 | C124 | F4 |
| 29 | C-64-22p | C125 | F5 |
| 30 | " | C126 | F5 |
| 31 | C-237-.1 | C127 | E5 |
| 32 | " | C128 | E5 |
| 33 | " | C129 | F4 |
| 34 | | | |
| 35 | | | |
| 36 | | | |
| 37 | R-177-1K | R101 | B2 |
| 38 | R-177-99K | R102 | B2 |
| 39 | R-2-220K | R103 | C2 |
| 40 | R-12-402K | R104 | D2 |

| ITEM | PART NO. | SCHEM. DESIG. | ZONE |
|---|---|---|---|
| 41 | R-76-1M | R105 | D2 |
| 42 | TF-170 | R106 | C2 |
| 43 | R-76-390K | R107 | D3 |
| 44 | R-320-43K | R108 | C3 |
| 45 | TF-168-1 | R109 | C4 |
| 46 | R-318 | R110 | C4 |
| 47 | R-76-10K | R111 | C4 |
| 48 | R-176-2.5K | R112 | C4 |
| 49 | R-176-1.6K | R113 | C4 |
| 50 | R-76-200K | R114 | D4 |
| 51 | R-176-100K | R115 | C4 |
| 52 | R-176-64K | R116 | C4 |
| 53 | TF-169 | R117 | C4 |
| 54 | R-76-3.3K | R118 | D4 |
| 55 | R-280-.01 | R119 | C5 |
| 56 | TF-171 | R120 | C5 |
| 57 | TF-172 | R121 | C5 |
| 58 | R-76-47K | R122 | E3 |
| 59 | R-3-22 | R123 | E3 |
| 60 | R-88-8.06K | R124 | E3 |
| 61 | R-88-1.24K | R125 | E3 |
| 62 | TF-173 | R126 | F4 |
| 63 | R-76-10M | R127 | F5 |
| 64 | R-76-2.2K | R128 | D3 |
| 65 | R-76-200K | R129 | D3 |
| 66 | " | R130 | D4 |
| 67 | R-76-15K | R131 | D4 |
| 68 | | | |
| 69 | | | |
| 70 | RT-9-1 | RT101 | C2 |
| 71 | | | |
| 72 | | | |
| 73 | | | |
| 74 | RF-28 | CR101 | C4 |
| 75 | RF-36 | CR102 | B5 |
| 76 | RF-34 | CR103 | C5 |
| 77 | RF-52 | CR104 | D3 |
| 78 | | | |
| 79 | | | |
| 80 | | | |

| ITEM | PART NO. | SCHEM. DESIG. | ZONE |
|---|---|---|---|
| 81 | | | |
| 82 | | | |
| 83 | | | |
| 84 | DZ-58 | VR101 | C5 |
| 85 | DZ-72-1 | VR102 | E3 |
| 86 | DZ-59 | VR103 | C5 |
| 87 | DZ-54 | VR104 | D3 |
| 88 | | | |
| 89 | | | |
| 90 | TG-47 | Q101 | B2 |
| 91 | TG-62 | Q102 | C2 |
| 92 | TG-138 | Q103 | D2 |
| 93 | TG-62 | Q104 | D2 |
| 94 | " | Q105 | D2 |
| 95 | TG-166 | Q106 | D2 |
| 96 | TG-62 | Q107 | C3 |
| 97 | " | Q108 | C3 |
| 98 | TG-47 | Q109 | D4 |
| 99 | TG-167 | Q110 | D3 |
| 100 | " | Q111 | D4 |
| 101 | " | Q112 | D4 |
| 102 | " | Q113 | D4 |
| 103 | TG-128 | Q114 | C5 |
| 104 | | | |
| 105 | | | |
| 106 | | | |
| 107 | | | |
| 108 | | | |
| 109 | | | |
| 110 | IC-342 | U101 | C4 |
| 111 | IC-352 | U102 | C4 |
| 112 | IC-347 | U103 | C5 |
| 113 | IC-227 | U104 | C5 |
| 114 | IC-347 | U105 | D4 |
| 115 | IC-283 | U106 | D4 |
| 116 | " | U107 | D5 |
| 117 | IC-343 | U108 | D5 |
| 118 | IC-283 | U109 | D3 |
| 119 | IC-353 | U110 | D4 |
| 120 | IC-354 | U111 | D4 |

| ITEM | PART NO. | SCHEM. DESIG. | ZONE |
|---|---|---|---|
| 121 | IC-351 | U112 | D4 |
| 122 | LSI-62 | U113 | D5 |
| 123 | LSI-61 | U114 | E4 |
| 124 | LSI-52 | U115 | E5 |
| 125 | IC-93 | U116 | E3 |
| 126 | IC-345 | U117 | E3 |
| 127 | IC-143 | U118 | E3 |
| 128 | IC-341 | U119 | E4 |
| 129 | IC-338 | U120 | E5 |
| 130 | IC-337 | U121 | F3 |
| 131 | IC-348 | U122 | F4 |
| 132 | LSI-60 | U123 | F5 |
| 133 | | | |
| 134 | | | |
| 135 | | | |
| 136 | | | |
| 137 | SW-448 | S101 | B2-B4 |
| 138 | SW-318 | S102 | F3 |
| 139 | | | |
| 140 | | | |
| 141 | | | |
| 142 | TR-201 | T101 | D2 |
| 143 | | | |
| 144 | | | |
| 145 | | | |
| 146 | FU-13 | F101 | B1 |
| 147 | FU-20 | F102 | F3 |
| 148 | | | |
| 149 | | | |
| 150 | | | |
| 151 | CR-21 | Y101 | F5 |
| 152 | | | |
| 153 | | | |
| 154 | | | |
| 155 | RL-82 | K101 | C3 |
| 156 | RL-59 | K102 | C3 |
| 157 | " | K103 | D2 |
| 158 | | | |
| 159 | | | |
| 160 | | | |

| ITEM | PART NO. | SCHEM. DESIG. | ZONE |
|---|---|---|---|
| 161 | 29465-2 | 6/U | B3-B4 |
| 162 | 29465-3 | | B2 |
| 163 | 29465-4 | | B2 |
| 164 | 29465-5 | | B3 |
| 165 | 29465-6 | | B3 |
| 166 | 29465-7 | | B3 |
| 167 | | | |
| 168 | 175-316 | P1002 | E2 |
| 169 | 175-321 | P1008 | F1 |
| 170 | | | |
| 171 | SO-69 | | E5 |
| 172 | SO-70 | J1006 | F5 |
| 173 | SO-84-40 | | F5 |
| 174 | | | |
| 175 | FA-99 | | D3 |
| 176 | | | |
| 177 | LU-87 | 3/U | A6-B6 |
| 178 | | | |
| 179 | SC-100-0 | LENGTH TO SUIT | B5 |
| 180 | SC-100-2 | " | B5 |
| 181 | SC-100-9 | " | B5 |
| 182 | | | |
| 183 | FH-12 | 2/U | F2,F3 |
| 184 | FH-21 | | B1 |
| 185 | FH-25 | | B1 |
| 186 | | | |
| 187 | MC-221 | | E2 |
| 188 | | | |
| 189 | HP-22 | 2/U | D2,D5 |
| 190 | | | |
| 191 | 26533 | | F1 |
| 192 | 6 EXT. L'WASHER | | F1 |
| 193 | 6-32 x 3/8 PHIL PAN HD | | F1 |
| 194 | | | |
| 195 | J-3 | 2/U | B5,C1 |
| 196 | | | |
| 197 | CS-476 | W101 | D4 |
| 198 | CS-339-3 | | D4 |
| 199 | CS-389-4 | J1009 | D3 |
| 200 | | | |

**Figure 6-5. Mother Board, Component Location Drawing, Dwg. No. 175-100 (Page 2 of 2)**

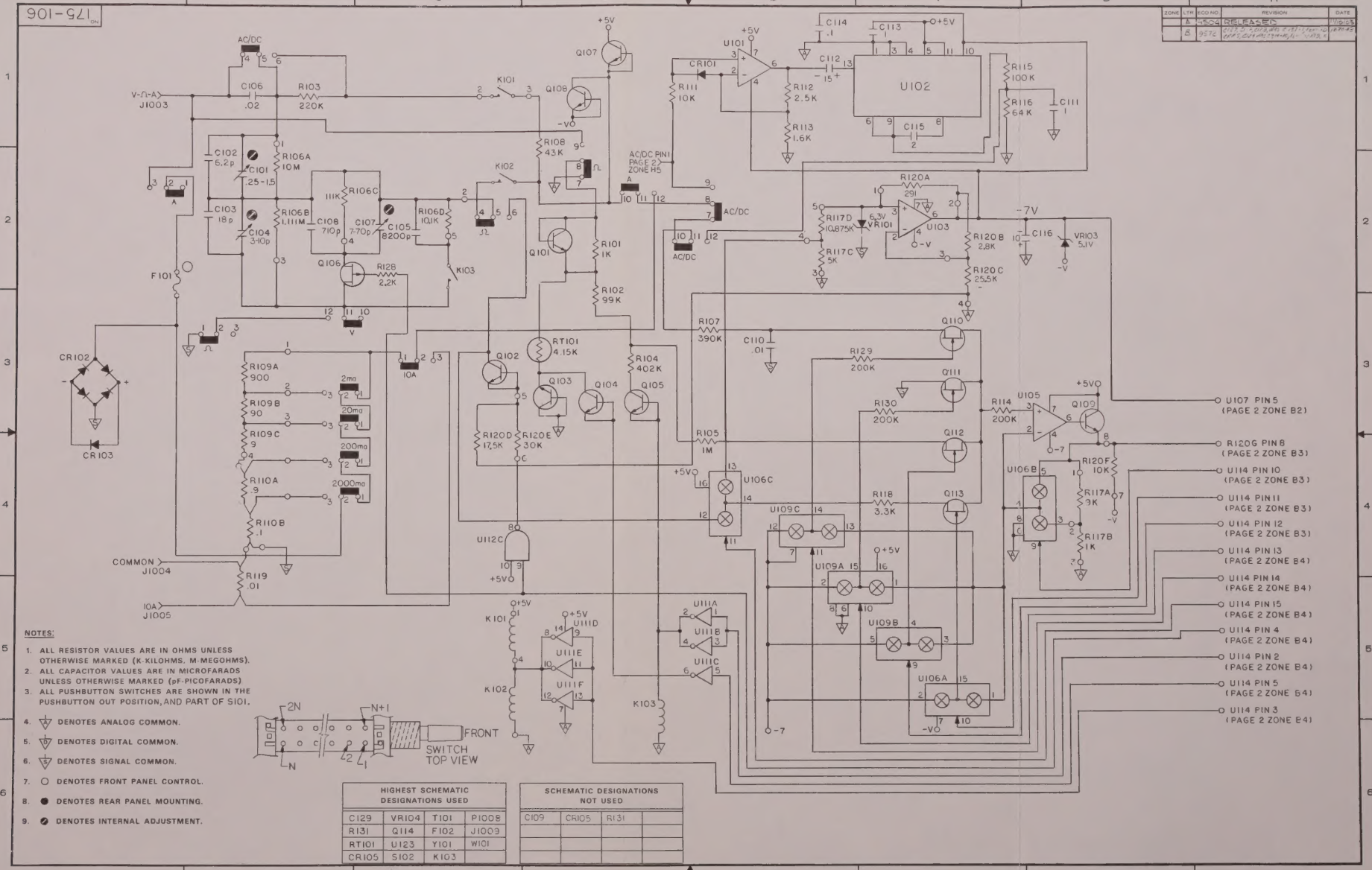
175-106
NOTES:
1. ALL RESISTOR VALUES ARE IN OHMS UNLESS OTHERWISE MARKED (K-KILOHMS, M-MEGOHMS).
2. ALL CAPACITOR VALUES ARE IN MICROFARADS UNLESS OTHERWISE MARKED (pF-PICOFARADS)
3. ALL PUSHBUTTON SWITCHES ARE SHOWN IN THE PUSHBUTTON OUT POSITION, AND PART OF S101.
4. DENOTES ANALOG COMMON.
5. DENOTES DIGITAL COMMON.
6. DENOTES SIGNAL COMMON.
7. DENOTES FRONT PANEL CONTROL.
8. DENOTES REAR PANEL MOUNTING.
9. DENOTES INTERNAL ADJUSTMENT.
SWITCH TOP VIEW
FRONT
HIGHEST SCHEMATIC DESIGNATIONS USED
C129 VR104 T101 P1008
R131 Q114 F102 J1009
RT101 U123 Y101 W101
CR105 S102 K103
SCHEMATIC DESIGNATIONS NOT USED
C109 CR105 R131
U107 PIN 5 (PAGE 2 ZONE B2)
R120G PIN 8 (PAGE 2 ZONE B3)
U114 PIN 10 (PAGE 2 ZONE B3)
U114 PIN 11 (PAGE 2 ZONE B3)
U114 PIN 12 (PAGE 2 ZONE B3)
U114 PIN 13 (PAGE 2 ZONE B4)
U114 PIN 14 (PAGE 2 ZONE B4)
U114 PIN 15 (PAGE 2 ZONE B4)
U114 PIN 4 (PAGE 2 ZONE B4)
U114 PIN 2 (PAGE 2 ZONE B4)
U114 PIN 5 (PAGE 2 ZONE B4)
U114 PIN 3 (PAGE 2 ZONE B4)

Figure 6-6. Mother Board, Schematic Drawing, Dwg. No. 175-106 (Page 1 of 2)

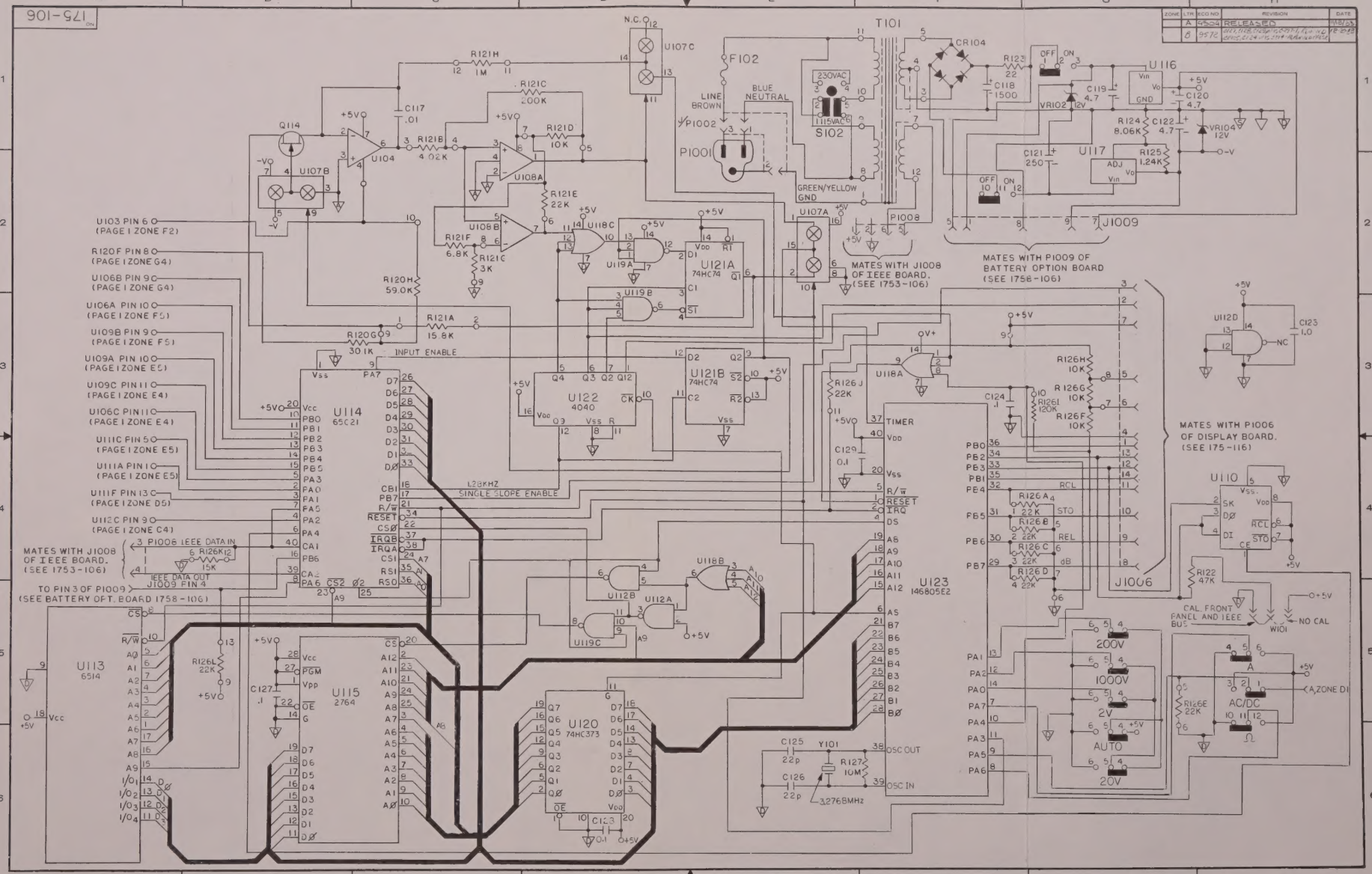


Figure 6-6. Mother Board, Schematic Drawing, Dwg. No. 175-106 (Page 2 of 2)

## Revision B Software

If you have Revision B level software in your Model 175, then you no longer have to remove the top cover to calibrate the instrument if frequency compensation has been verified. The instrument may be calibrated from front panel buttons. Make the following changes to the Model 175 Instruction Manual to reflect this design improvement:

**1. Delete paragraph 5.7.2 (Calibration Jumper) on page 5-7 and replace with the following:**

### 5.7.2 Calibration Storage Enable

The Model 175 must be in calibration storage enable in order to realize permanent storage of the calibration constants. If the instrument is not placed in enable, subsequent calibration will be lost when the instrument is turned off. Perform the following steps to place the Model 175 in calibration storage enable:

1. If the Model 175 is presently on, turn it off using the ON/OFF power switch.
2. While holding in the STO/CLR button, turn the instrument on using the ON/OFF power switch.
3. When the message "CAL" is displayed, release the STO/CLR button. "CAL" will disappear, the instrument will return to the normal display mode, and storage of calibration constants is enabled.
4. Press in the REL and dB pushbuttons simultaneously until the message "CAL" is displayed again. Release the buttons. The unit is now ready to be calibrated as indicated by the "C" annunciator on the display.

**2. Delete paragraph 5.7.8 (Calibration Storage) and Figure 5-2 on page 5-9; replace with the following:**

### 5.7.8 Calibration Storage

To store the calibration constants and then exit calibration, simultaneously press the REL and dB buttons until the message "Stor" is displayed. If instead the message "out" is displayed, then calibration storage was not enabled as explained in paragraph 5.7.2 and the calibration constants will only be valid until the Model 175 is turned off.

Now, cycle power to the Model 175 and begin normal operation.